



UNITED STATES PATENT AND TRADEMARK OFFICE

cen

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,438	02/13/2004	Colin McCullough	56873US002	8765
32692 7590 01/28/2008 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			EXAMINER SAVAGE, JASON L	
			ART UNIT 1794	PAPER NUMBER
			NOTIFICATION DATE 01/28/2008	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LegalUSDocketing@mmm.com
LegalDocketing@mmm.com

Office Action Summary

Application No.

10/779,438

Applicant(s)

MCCULLOUGH ET AL.

Examiner

Jason L. Savage

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/13/2007
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough et al. (US 6,344,270) in view of any one of Ozawa et al (JP 08-176701 English Machine Translation), Shimojima et al (JP 03-071509), Blucher'902 (2003/0029902) or Blucher'538 (2005/0061538).

McCullough teaches a composite wire or cable that includes fiber reinforced metal matrix composites comprising a wire core containing at least one tow comprising a plurality of substantially continuous, longitudinally positioned reinforcing fibers of ceramic or carbon which is encapsulated within a metal matrix (col. 3, ln. 31-45). McCullough further teaches that the wire or cable may have a metal covering the metal matrix composite core (col. 9, ln. 21-65 and figures 4-5). McCullough also teaches that the wire or cable has a roundness value of at least 0.95, a roundness uniformity value of not greater than 1.5%, and a diameter uniformity value of not greater than 0.5% over a length of at least 100 meters (col. 1, ln. 57 – col. 2, ln. 6). McCullough further exemplifies embodiments wherein the roundness uniformity value is as low 0.94% and the diameter uniformity value of 0.21% (Table 1, runs 12 and 6 respectively).

Although the prior art does not exemplify embodiments having the claimed properties, it teaches that the claimed properties as being maximum or minimum values with no upper or lower limit boundaries being specified. As such, it would have been obvious to one of ordinary skill in the art to have formed the metal-clad metal matrix composite wire having a roundness uniformity value lower than the 1.5% and a diameter uniformity value lower than the 0.5% including having values within the ranges claimed by Applicant. Furthermore, McCullough exemplifies embodiments having values that are so close that prima facie one skilled in the art would have expected them to have the same properties, *Titanium Metals Corporation of America V. Banner*, 227 USPQ 773.

Regarding the limitation that a single metal matrix composite wire having an exterior surface to which a metal cladding covers and contacts substantially the entire exterior surface or the metal matrix composite wire core, McCullough does not exemplify an embodiment wherein a the metal matrix composite core comprises a metal cladding.

Ozawa teaches a metal matrix composite wire core **10A** comprising at least one tow bundle of continuous fibers **10** positioned with an aluminum metal matrix (Detailed Description of the Invention: Par[0007]). Ozawa further teaches that a covering layer **9** of aluminum is formed on the exterior surface of the metal matrix composite wire core **10A** (Detailed Description of the Invention: Par[0008 and 0010]). Ozawa teaches that such a metal covered metal matrix composite wire has good flexural rigidity and is

particularly suitable for use as a power transmission line cable (Detailed Description of the Invention: Par[0008 and 0005-0006]).

Shimojima teaches a metal matrix composite wire core **1** comprising at least one tow bundle of long fibers **1a** positioned with an aluminum metal matrix **1b** (Abstract and Figure 3). Shimojima further teaches that a coating layer **4** of aluminum is formed on the exterior surface of the metal matrix composite wire core **1** (Abstract and Figure 6). Shimojima teaches that such a metal coated metal matrix composite wire prevents reduction in tension and flexibility of a power transmission line cable (Abstract).

Blucher'902 teaches a metal matrix composite wire core **58** comprising at least one tow bundle of long fibers positioned with an aluminum metal matrix having a cladding **50** formed on the exterior surface of the metal matrix composite wire core **58** (par [0046] and Figure 10). Blucher'902 teaches that such a metal clad metal matrix composite wire shows improved handling characteristics to similar wires which are not clad (par[0044]).

Blucher'538 teaches a metal matrix composite wire core **10** comprising at least one tow bundle of long fibers **12** positioned with an aluminum metal matrix **14** having a clad jacket **16** formed on the exterior surface of the metal matrix composite wire core **10** (par [0015, 0017-0018] and Figures 1-2). Blucher'538 further teaches that such a clad jacketed metal matrix composite wire exhibits considerable weight savings over existing power transmission cables, relatively high strength and a low coefficient of thermal expansion (par[00020]).

It would have been obvious to one of ordinary skill in the art to have applied a clad coating to the exterior surface of the metal matrix composite wire core of McCullough since it is well known in the art to do so such as demonstrated by Ozawa, Shimojima, Blucher'902 and Blucher'538. One of ordinary skill in the art would have been motivated to have applied such a cladding coating to the wire core to form a composite having good flexural rigidity, improved handling characteristics, considerable weight savings, relatively high strength and/or a low coefficient of thermal expansion such as would be beneficial for power transmission lines

In response to the issue whether the reference is nonanalogous art, it has been held that the determination that a reference is from a nonanalogous art is twofold. First, one decides if the reference is within the field of the inventor's endeavor. If it is not, one proceeds to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved, *In re Wood*, 202 USPQ 171, 174. In the instant case, the references of McCullough, Ozawa Shimojima, Blucher'902 and Blucher'538 are generally drawn to forming composite wires or cables that include a wire core containing a plurality of fibers embedded in an aluminum matrix.

Regarding claim 25, McCullough teaches what is set forth above but does not exemplify an embodiment wherein the roundness value is at least 0.98. However, as was set forth above, since McCullough only teaches the minimum value for the roundness value of being at least 0.95, higher values including that claimed by Applicant would have been obvious.

Regarding claims 2 and 26, McCullough teaches embodiments comprising multiple tows (Figure 4). Furthermore, McCullough teaches the composite wire or cable typically contains a plurality of tows (col. 1, ln. 40-48).

Regarding claims 3-4 and 27-28, since McCullough as modified by the prior art teaches the same wire structure as that claimed by Applicant including having a metal cladding covering, the wire of McCullough would be just as plastically deformable and just as effective to dampen recoil effects to prevent secondary fractures and the as the wire claimed by Applicant.

Regarding claims 5 and 29, the clad wire of McCullough would exhibit a larger strain to failure as compared to the strain to failure exhibited by an unclad wire.

Regarding claims 6-8 and 30-31, McCullough teaches the matrix material may be aluminum, zinc, tin and alloys thereof and further teaches that the matrix material is preferably aluminum having a purity of greater than 99.95% by weight (col. 6, ln. 1-16).

Regarding claims 9-13 and 32-36, McCullough is silent to the material used to form the metal cladding. However, it would have been within the purview of one of ordinary skill in the art to have recognized what materials could suitably be used to clad the wire. Given the teaching that the matrix material is preferably pure aluminum, it would have been obvious to have used high purity aluminum as the metal cladding as well with a reasonable expectation of success. A cladding of aluminum would meet the claim limitations of having a melting point less than 700 C.

Regarding claims 14 and 37, McCullough is silent to the cladding thickness. However it would have been within the purview of one of ordinary skill in the art at the

time of the invention to have determined the thickness of the cladding layer that would be necessary in order to maintain the wires in the core in a stranded configuration (col. 9, ln. 32-38). Absent a teaching of the criticality or showing of unexpected results due to the claimed thickness, it would not provide a patentable distinction over the prior art.

Regarding claims 15 and 38, McCullough teaches that at least 85% of the wires in the tow are continuous (col. 3, ln. 31-44).

Regarding claims 16 and 39, McCullough teaches the core comprise between 30 to about 70 volume % of fibers and preferably between 40 to 60 volume % of fibers (col. 5, ln. 45-53).

Regarding claims 17-19 and 40-42, McCullough teaches the fibers are ceramic oxide fibers such as polycrystalline alpha alumina based fibers wherein the fibers comprise at least 99 percent by weight of alumina (col. 4, ln. 17-31).

Regarding claims 20-24 and 43-47, McCullough teaches a plurality of the metal clad composite wires may be helically stranded to form a permanently set cable and that the cable may also include core and shell structure comprising a shell of secondary aluminum wires (col. 8, ln. 52-68).

Response to Arguments

Applicant's arguments filed 11-13-07 have been fully considered but they are moot in view of the new grounds of rejection.

Applicant argues that McCullough fails to teach the claimed invention which has been amended to recite that a single metal matrix composite wire has an exterior

surface having a metal cladding covering and contacting substantially the entire exterior surface. Applicant further argues that the combination with Maschinenkunde would not meet the claimed invention since the coating of Maschinenkunde is formed on an insulation layer as opposed to the surface of the metal matrix composite wire exterior surface. The rejections drawn to McCullough in view of Maschinenkunde have been withdrawn; however the claims now stand rejected under the new grounds of rejection set forth above.

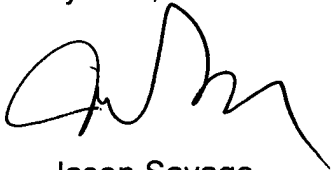
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on 571-272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Application/Control Number:
10/779,438
Art Unit: 1794

Page 9

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Jason Savage
1-16-08



Jennifer McNeil
Primary Examiner
1794